CHEMICAL BONDING

Chemistry Presentation

Submitted to Sir Esaam Jamil

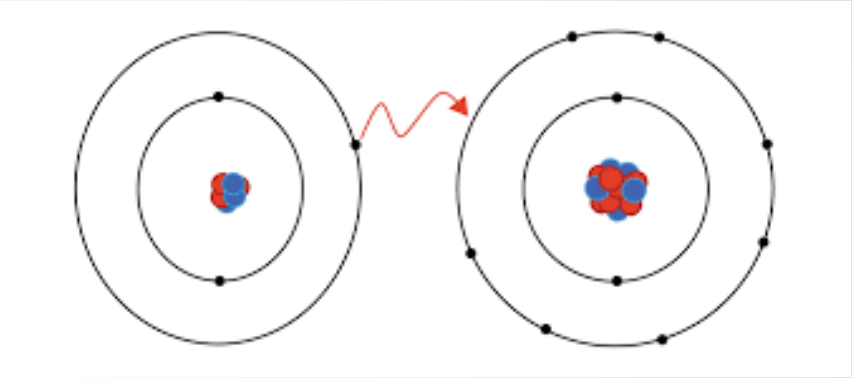
By: **SUALEHA TANVEER**

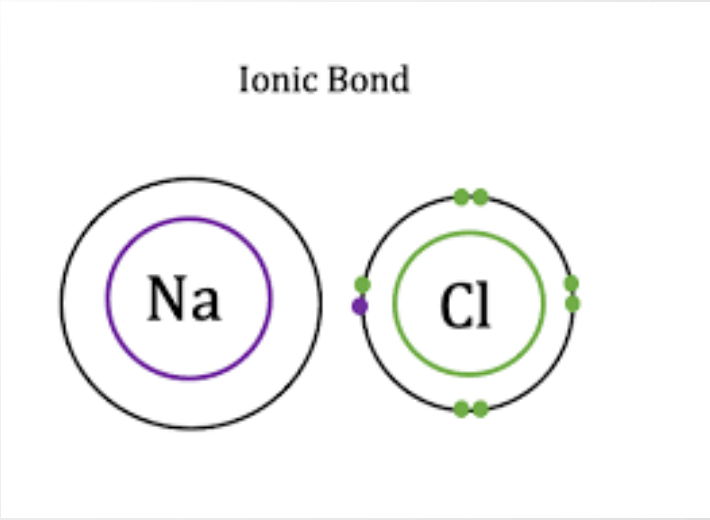
CLASS: **C1 RED (O-LEVEL CAMBRIDGE SECTION)**

What is an Ionic Bond?

- An ionic bond is the electrostatic force of attraction between positively charged metal ions and negatively charged non-metal ions.

- It is formed by the transfer of electrons.



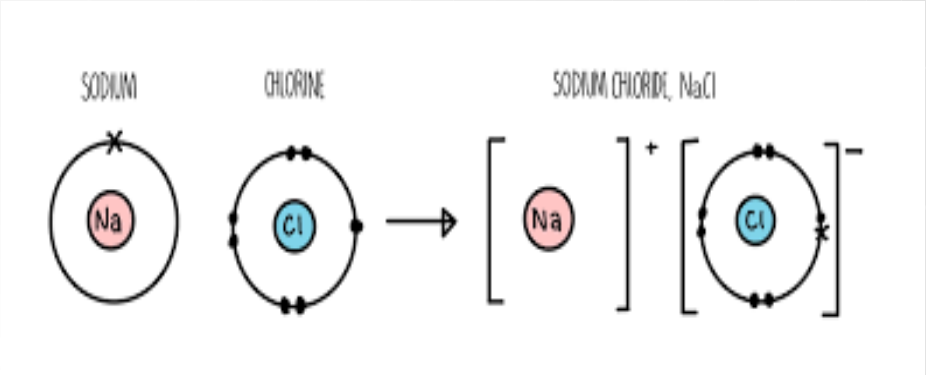


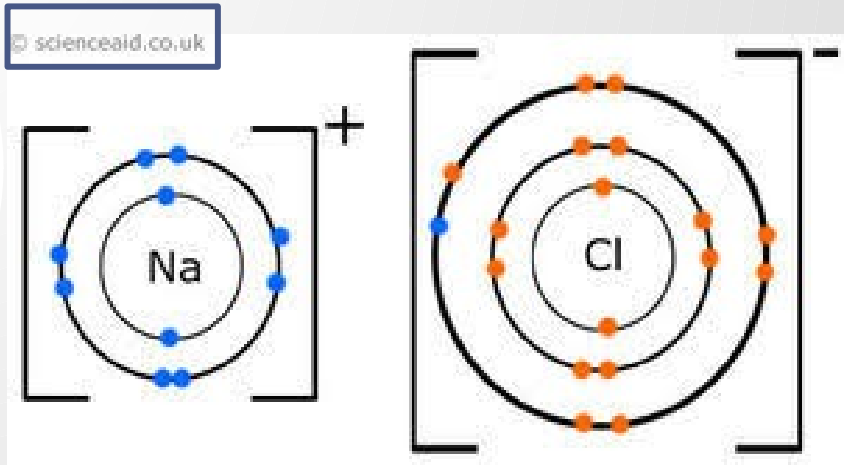
Formation of Ionic Bond – NaCl

Sodium (Na) loses 1 electron to form Na^+.

Chlorine (Cl) gains 1 electron to form Cl^-.

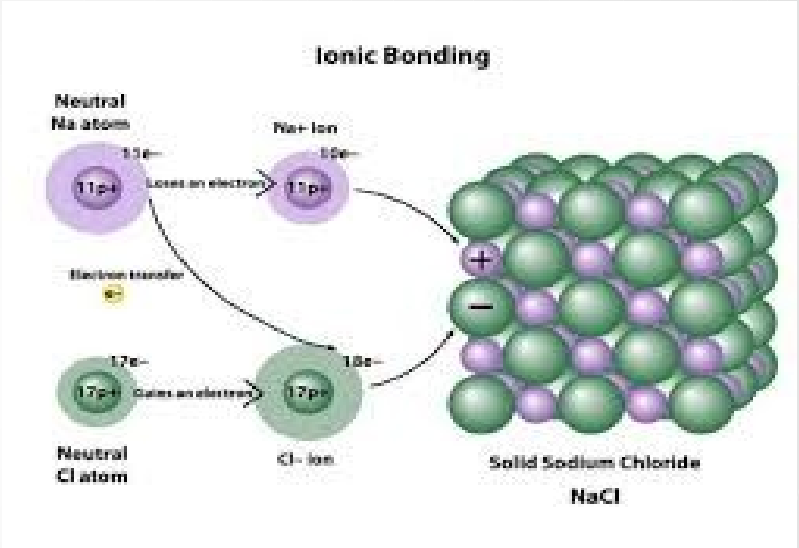
These oppositely charged ions attract to form NaCl.

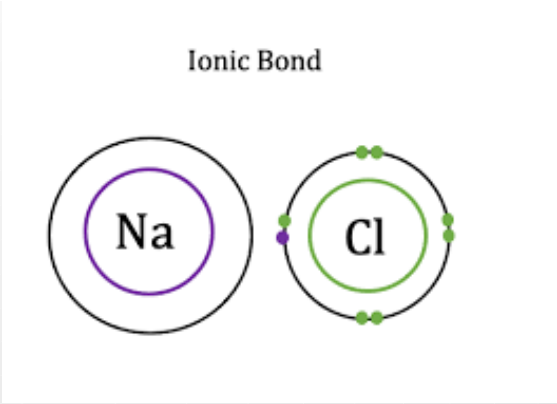




Properties of Ionic Bonds

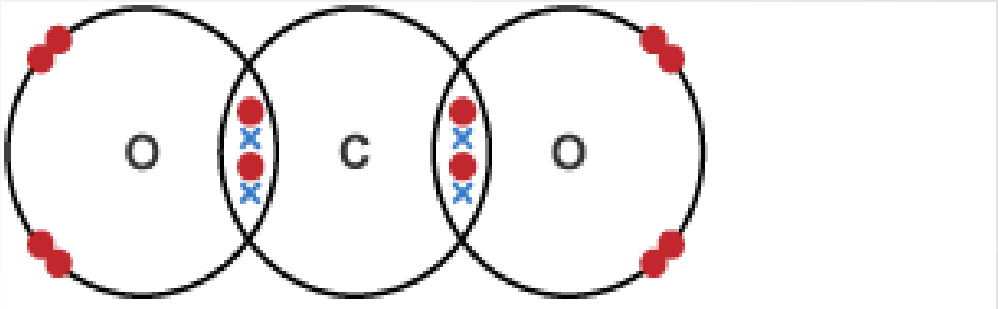
- 1. High melting and boiling points – due to strong electrostatic forces.
- 2. Conduct electricity when molten or dissolved – ions are free to move.
- 3. Soluble in water – water separates the ions.



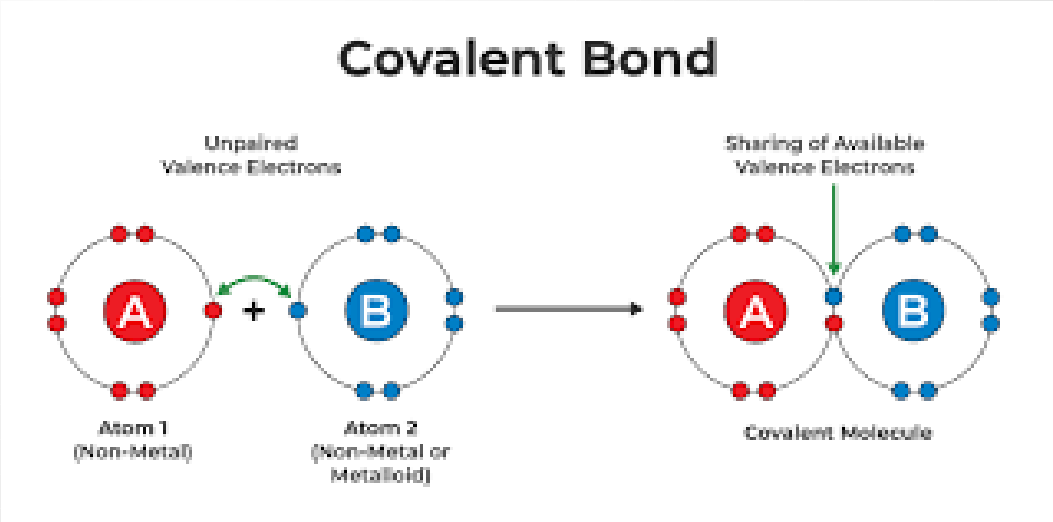


What is a Simple Covalent Bond?

- A covalent bond is formed by sharing electrons between two non-metal atoms.



- These bonds form discrete molecules.



Examples of Covalent Bonds: H_2O, CO_2, N_2

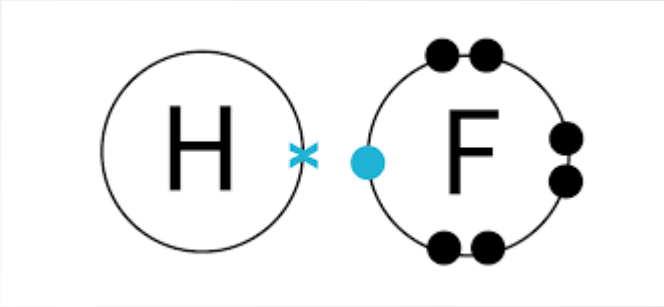
H_2O: Oxygen shares electrons with 2 Hydrogen atoms.

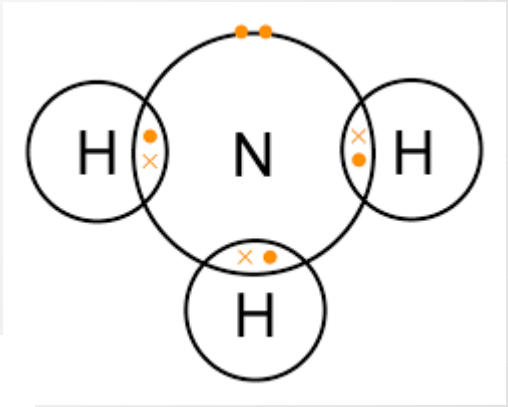
CO_2: Carbon forms double bonds with 2 Oxygens.

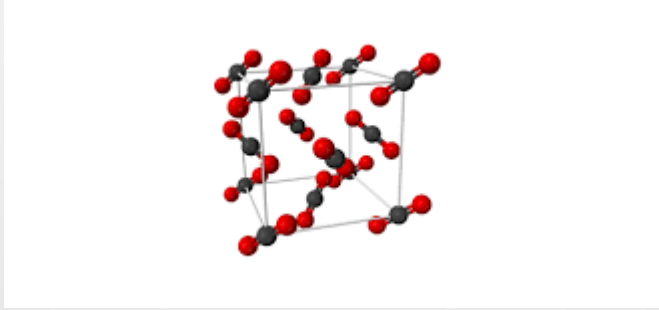
N_2: Triple bond between two Nitrogen atoms.

Properties of Simple Covalent Bonds

- 1. Low melting and boiling points – weak intermolecular forces.
- 2. Do not conduct electricity – no free ions or electrons.
- 3. Often gases or liquids – due to weak forces between molecules.

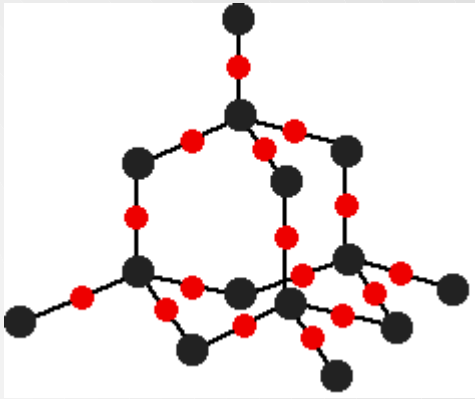




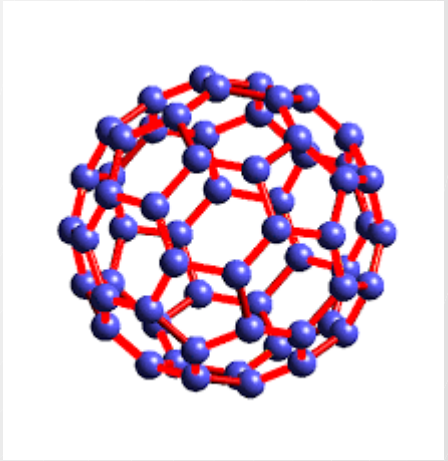


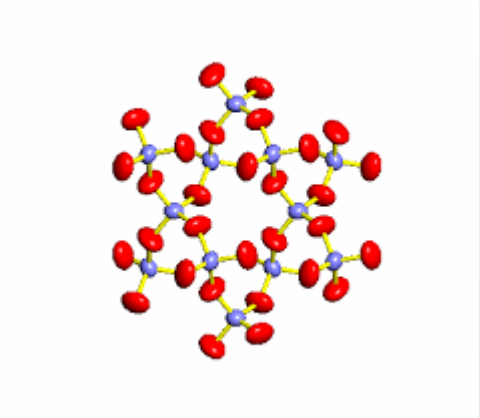
What is a Giant Covalent Structure?

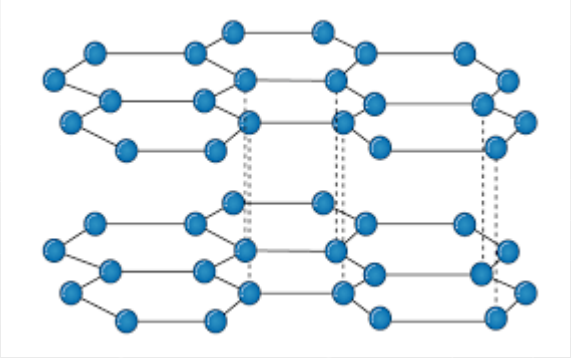
- A giant covalent structure is a 3D network of atoms connected by covalent bonds.



- Examples include Diamond, Graphite, and Silicon Dioxide.

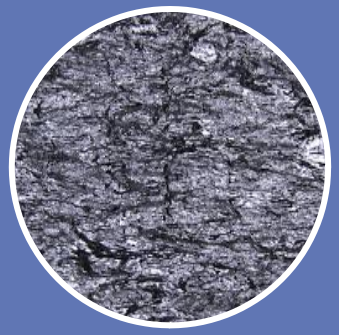






Properties of Giant Covalent Structures

1. High melting points – strong covalent bonds.



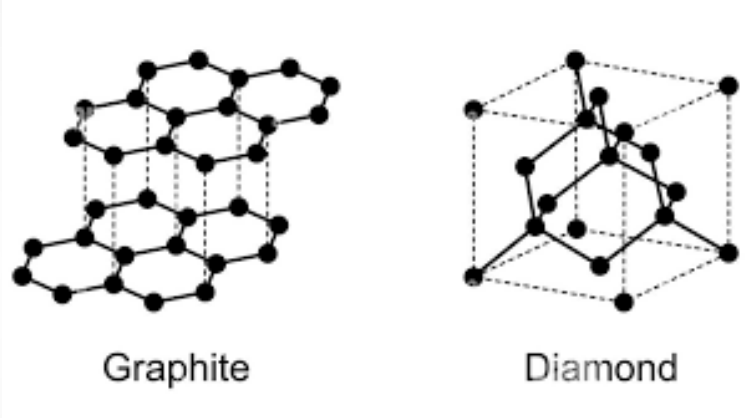
2. Hardness (Diamond) vs Softness (Graphite).

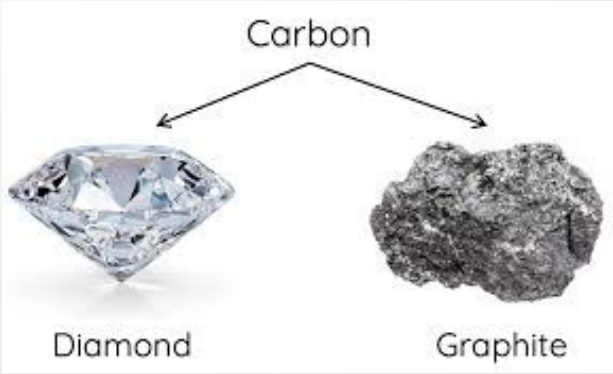
3. Electrical conductivity – only graphite conducts (delocalized electrons).

Examples: Diamond and Graphite

Diamond: Each carbon forms 4 bonds – very hard.

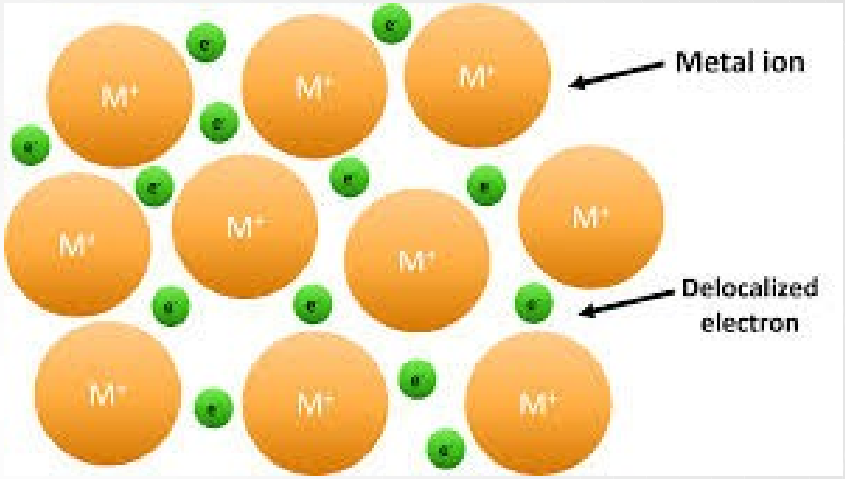
Graphite: Each carbon forms 3 bonds – forms layers that can slide.



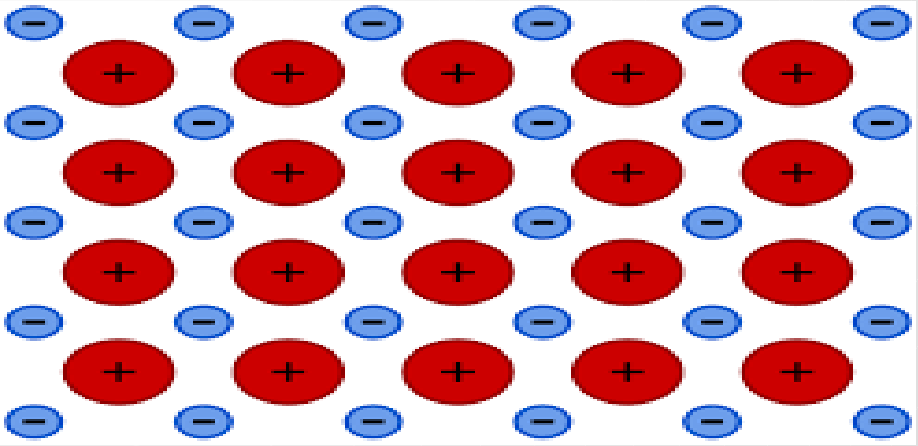


What is a Metallic Bond?

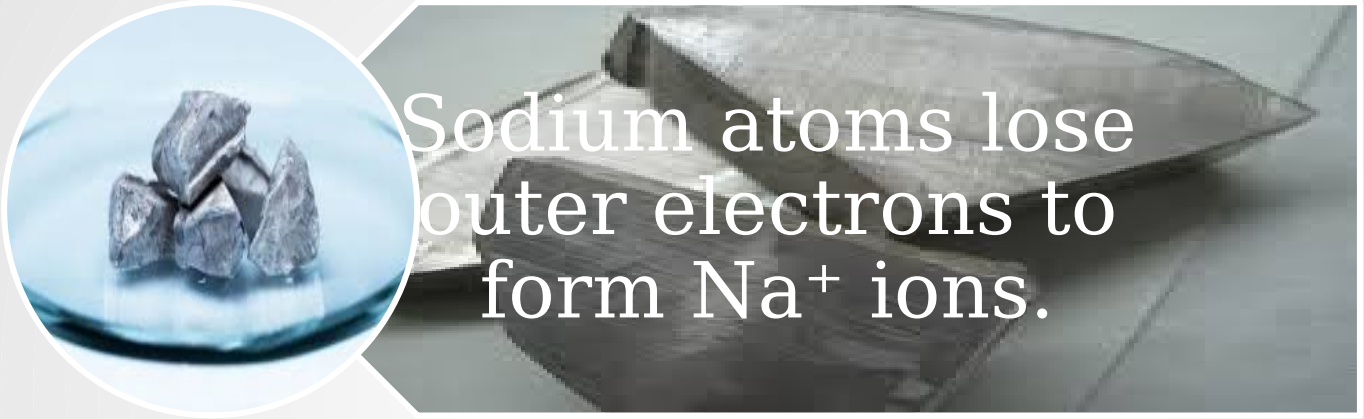
- A metallic bond is the attraction between positive metal ions and a 'sea' of delocalized electrons.

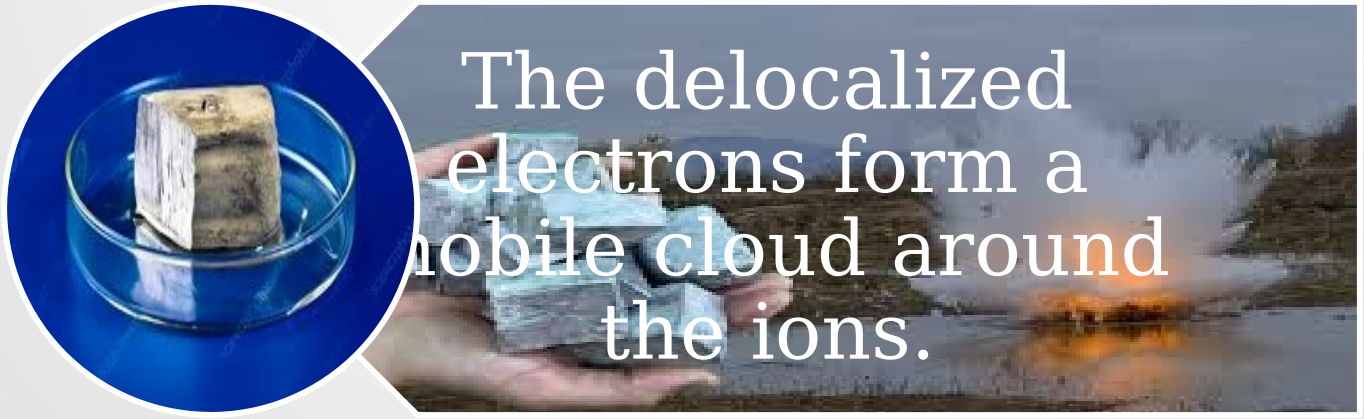


- These electrons are free to move.



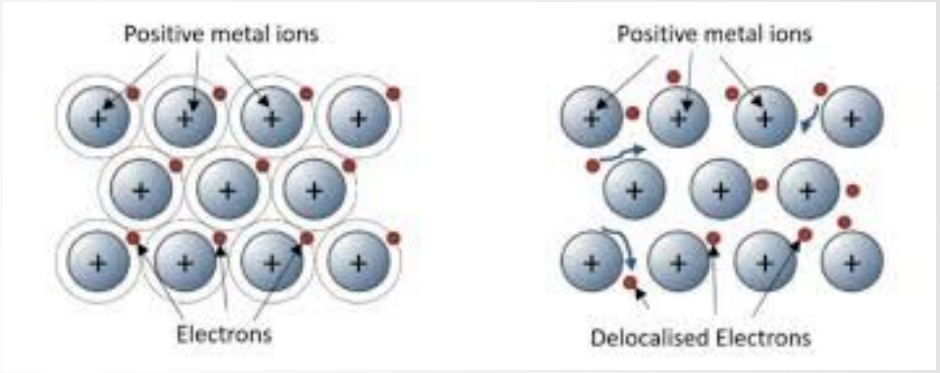
Formation Example – Sodium Metal

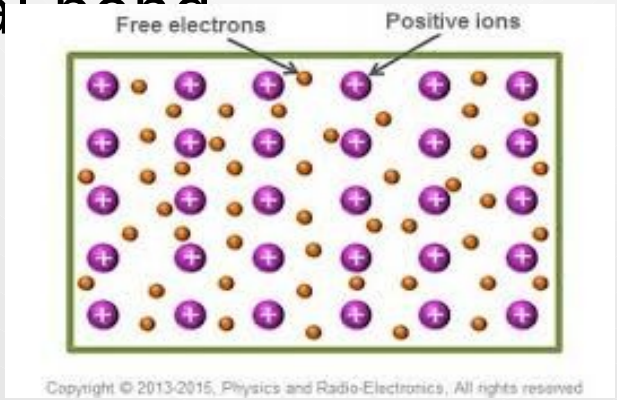




Properties of Metallic Bonds

- 1. Conduct electricity and heat – due to mobile electrons.
- 2. Malleable and ductile – atoms can slide over each other.
- 3. High melting/boiling points – strong metal bond





CONCLUSION:

Ionic Bonds: Formed by **transfer of electrons** (metal + non-metal), strong, high melting points, conduct electricity in solution.

Covalent Bonds: Formed by **sharing electrons** (non-metal + non-metal), usually weak forces between molecules, low melting/boiling points.

Giant Covalent Structures: Strong 3D covalent networks (e.g., diamond, graphite), very high melting points.

Metallic Bonds: Sea of delocalized electrons around metal ions, conductive, malleable, strong.

THANK YOU